HUMAN NUTRITION DEPARTMENT

INSTITUTE OF PUBLIC HEALTH

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UNIVERSITY OF GONDAR

PREVALENCE OF CHRONIC ENERGY DEFICIENCY AND ASSOCIATED FACTORS AMONG NON-PREGNANT AND NON-LACTATING RURAL WOMEN OF AGE GROUP (18-49 YEARS) IN MIRAB-BADWACHO WOREDA, SOUTH ETHIOPIA

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Prevalence of chronic energy deficiency and associated factors among non-pregnant and non-lactating rural women (18-49 years) in Mirab-badwacho Woreda, South Ethiopia

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List of Acronyms

AOR	Adjusted odds ratio
BMI	Body mass index
CED	Chronic energy deficiency
COR	Crude odds ratio
DDS	Dietary diversification score
EDHS	Ethiopia demographic and health survey
FAO	Food and agricultural organization
FVS	Food variety score
IDD	Individual Dietary diversification
NCHS	National center of health static
NPNL	Non-pregnant and non-lactating
SNNPR	South nation nationalities peoples of republic
SPSS	Statistical Package for Social Sciences
SRS	Simple random sampling
UNICEF	United nation international children's emergency fund
WHO	world Health Organization

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Abstract

Introduction: - Non-pregnant and non-lactating women are the most vulnerable and neglected segments in most society. Most countries work exhaustively to reduce maternal and child death only by taking an intervention on pregnant and lactating women. However, the non-pregnant and non-lactating women are the best window of opportunity to implement strategies, to correct maternal and child death and improve good pregnancy outcomes especially in Ethiopia.

Objective: To assess the prevalence of chronic energy deficiency and associated factors among rural women (18-49 ages) in Mirab-Badwacho Woreda, Southern Ethiopia, 2014

Methods: A community based cross sectional study design was employed from April to May 2014. Multi stage sampling technique was used to select 636 non-pregnant and non-lactating women. Data were collected by structured questionnaire using 10 BSc nurses as data collectors. Cleaned data were entered to EPI-info 3.5.3 and export to SPSS version 20 for analysis. Descriptive static was done; and the association between the dependent and independent variables were measured using OR at 95% confidence Interval. Those variables with p-value of less than 0.05 in the multivariate analysis were considered as significant.

Results: The overall prevalence of chronic energy deficiency in this study was 35.2% (95% CI: 31.5%, 38.9%). Age of the respondent (AOR=1.91, 95% CI: 1.06, 3.46), family size (AOR= 1.61, 95% CI: 1.14, 2.27), frequency of feeding in the past 24 hour (AOR=3.18, 95% CI: 1.26, 8.05). Treating water for drinking (AOR=1.82, 95% CI: 1.11, 3.08), and history of maternal illness (AOR=1.60, 95% CI: 1.13, 2.26) were significantly associated with women chronic energy deficiency.

Conclusion and recommendation: chronic energy deficiency was found to be high prevalence in the study area. Therefore, sustained health and nutrition education is recommended to the communities on family planning and health care practice and proper water treatment in order to improve health and nutrition outcomes of non-pregnant and non-lactating women.

Key word: - Non-pregnant, non-lactating, chronic energy deficiency, south Ethiopia

1. Introduction

1.1. Statement of the problem

Several studies have indicated that malnourished mothers are more vulnerable to diseases, encounter more miscarriages and give birth to chronic energy deficient mother especially whose survival is also at risk for rural women(1, 2) Malnourished mothers have reduced lactation performance contributing to the increased risk of maternal mortality and morbidity. Inadequate intake causes nutritional disorders; which mainly causes of morbidity and mortality(3, 4). The major problems are protein-energy malnutrition and micronutrient deficiencies (3, 5, 6).The United Nations Food and Agriculture Organization estimates that nearly 870 million people from 7.1 billion people in the world, or one in eight, were suffering from chronic undernourishment in 2010-2012. About 75 % of the world's poor residing in rural areas(7). Almost all they were hungry people, 852 million, live in developing countries (8), representing 15 % of the population of developing counties. In Bangladesh, over 34.0% of the age group (18-49) groups, which are suffering in chronic energy deficiency, are rural women(9, 10).

The number of hungry grew in Africa over the period, from 175 to 239 million, with nearly 20 million added in the last few years. Nearly one in four are hungry. From 22 countries in sub-Saharan Africa(11, 12), over 30 % of all women were found in suffer from chronic energy deficiency(13-15) and Ethiopia is the second most populous country in sub-Saharan Africa with a population of over 82.8 million people and out of which 44.8 millions are females(5). It is a country over 84% of the population resides in a rural area. The typical female advantage in life expectancy is not seen in Ethiopia and this suggest that, there were systematic problems in women's health care(16). Maternal chronic energy deficiency in Ethiopia was found to be 30.5%, 26.9% and 27% in 2000, 2005 and 2011 respectively (16-18). In spite of the fact that, the target consequences of malnutrition includes death, disability, stunted mental and physical growth and as a result, retarded national socio-economic development(19).

1.2. Literature review

1.2.1. Over view of maternal nutritional status and prevalence

Diet and nutrition are important factors in the promotion and maintenance of good health throughout the life cycle, Income, prices, individual preferences and beliefs, cultural traditions, as well as geographical, environmental, social and economic factors all interact in a complex manner to shape dietary consumption patterns and affect the morbidity and clinical status of women. A normal balanced diet must include daily foods from the various food groups in sufficient amounts to meet the needs of an individual and to increase immunity(18, 20). From 22 countries in sub-Saharan Africa over 30 percent of all women found, suffer from chronic energy deficiency(13, 14). Study in Bangladesh show 34% of the women were chronic energy deficient (9). Cross sectional study conducted in village Bashahpur, Gurgaon of India shows 25% NPNL(18) women's were chronic energy deficient having a BMI <18.5 and 16% were overweight or obese. In Ethiopia, 27% of women's they fall below the cut-off of 18.5 for the body mass index (BMI), and 9 % are moderately or severely chronic energy deficient (16).

1.2.2. Factors of maternal chronic energy deficiency status

1.2.2.1. Socio demographic characteristics

Ethiopia ranked 121 among 134 countries in terms of the magnitude and scope of gender-based disparities according to the Global Gender Gap Report (2010) ranks (4, 18). Prevailing social attitudes favors men/boys over women/girls with regards to food, health care and education while leaving women/girls with limited opportunities for participation in formal sector employment(7). In addition, closing the gender gap in education can boost rural women's empowerment by increasing agricultural incomes and to achieve full and productive employment and decent work for all, including women and young people(7, 14, 18). Study in Central-India show nutritional education necessary to promote desirable practices in all aspects of human life, which have direct or indirect effects on nutritional status(3, 21) and to be poor in hygiene and grinding under the socio-cultural were significantly associated with maternal malnutrition. The studies in India show mean household was eight with

the standard deviation of two(3). Poverty is the principal cause of hunger(1). World Bank has estimated that, there were 1,345 million poor people who were live in developing countries (1). Marital status was one of the factors for gender pay gap (22, 23). Study in Bangladesh revealed that socioeconomically and women's malnutrition status is significantly associated. 28.5% of chronic energy deficient are family income and women's education were the most important determinants(9, 20).

1.2.2. Maternal characteristics

Northern Nigeria research evidence underscores the importance of water and sanitation in reducing a broad range of infections and so improving nutritional status of women's(23). With under-nutrition, one of the most vulnerable groups are women. The majority of women who live in rural areas are in a constant energy - deficient state caused by poor dietary intake, heavy workload and a high infection rate(24). Illiterate women comprised 87.0% of the total and their main occupation was domestic activities (housewives) (3).

1.2.3. Dietary intake

The study conducted in India about 45% of the NPNL women consumed milk and milk products daily including curd, etc. In case of green leafy vegetables, only 5% were finding to consume it daily, 61% consumed thrice a week and rest consumed it occasionally(3).

The study in Tigray also revealed that, the median dietary diversity score of the study participants was 5.0, which was lower than by half of the food groups on FAO 14 food grouping (15).

1.2.4. Maternal feeding practices

Study in rural India shows that, younger non-pregnant and non-lactating were more aware about the general nutrition and health practices as compared to the older females (3). This means that with better awareness and health practices, the energy status of females increased.

1.2.5. Nutritional status and Anthropometric measurement

Study in the Tanzania also showed, BMI correlated with the Dietary Diversity Score with the consumption of foods from the food groups (7). Studies in Bangladesh shows that, 28.5% of the women are thinness(chronic energy deficiency), almost 58.0% of the women had normal weight (9). In Muheza, rural India 36% of non-pregnant and non-lactating, rural women classified as chronic energy deficiency in terms of body mass index (BMI)(20). The study in coastal zone of India mean BMI of NPNL women 24.2 (± 4.6 SD) kg/m^2 and in Ghana Savanna zone the mean BMI was 21.3 (± 2.4) Kg/m^2 (3, 24). Studies in Bangladesh shows that, the nutritional status and dietary intake rural women finding was mean age 30.2 (± 2.9), weight: 46 (± 8.5), height: 149 (± 5) cm, and BMI 20.5 (± 3.5) Kg/m^2 of non-lactating and non-pregnant participants(25). Studies in Muheza rural India show that, the mean age of women were 34.6 and house hold wealth Index was low (33.3%), Medium (29.0%) and high (37.7%)(5). Study in east Africa countries shows that, in Zimbabwe 12% of NPNL women were less than 18.5 kg/m^2 of non-pregnant and non-lactating women were BMI less than 18.50 Kg/m^2 (26) and also Significant seasonal variation in Ethiopia for lowest BMI was from Mar-Apr(27).

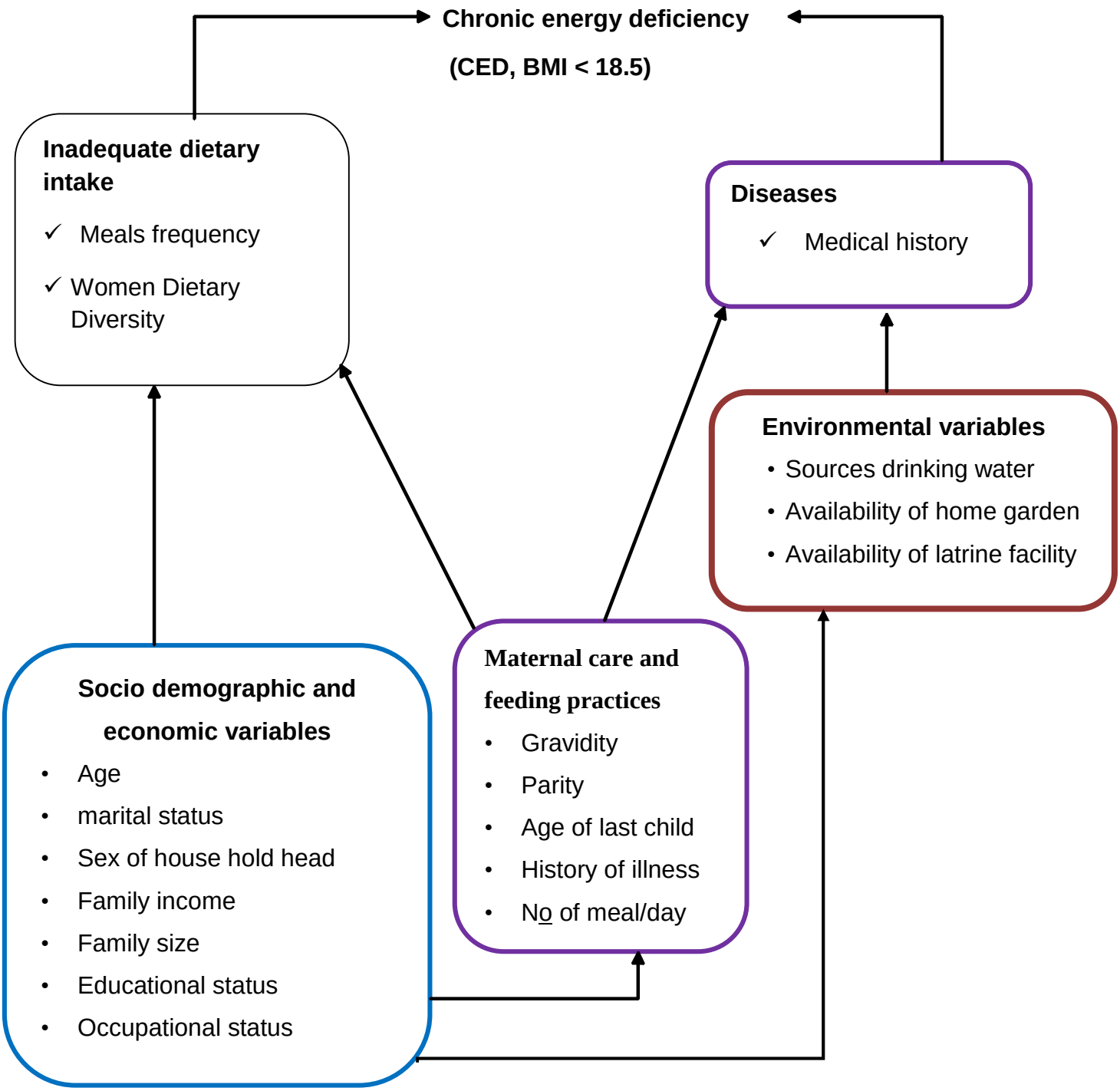

Figure1. Conceptual framework for maternal chronic energy deficiency

Source: UNICEF Conceptual Framework, modified by Black et al., Lancet 2008

1.3. Justification of the study

Many reports indicate maternal malnutrition is high in the world. Especially in the developing countries, maternal malnutrition is the most serious and devastating problem, which affect nearly 870 million people(7). Ethiopia is one of the first ranked by chronic energy deficiency from east and southern Africa countries(4).

However, traditionally, intervention aimed at improving women nutritional status have targeted those either pregnant or lactating with less attention given to non-pregnant and non-lactating women. Therefore, exact prevalence and factors are not well address to prevent non-pregnant and non-lactating women chronic energy deficiency. For that reason, this study will be used by planers, programmers, and different stakeholders and governmental and none governmental organizations to design appropriate evidence based strategies at each level on non-pregnant and non-lactating maternal nutritional improvement. In addition, for the coming researchers who are interested in further study on topics it will be uses as a base.

2. Objectives

2.1. General objective

To assess the prevalence of chronic energy deficiency and associated factors among non-pregnant and non-lactating rural women of age group (18-49 ages) in Mirab-Badwacho Woreda, Hadiya zone, Ethiopia, 2014.

2.1. Specific objectives

- To determine the prevalence of chronic energy deficiency among non-pregnant non-lactating rural women of age group (18-49 years)
- To identify factors associated with chronic energy deficiency in non-pregnant and non-lactating rural women of age group (18-49 years)

3. Methods and Materials

3.1. Study design

Community based Cross-sectional study design was employed.

3.2. Study Area and Period

The study was conducted in Mirab-Badwacho Woreda, which is found in Hadiya Zone, Southern Ethiopia. Hadiya Zone is one of the Zone's in southern nations nationalities and people region (SNNPR) and has a population of 1,547,848 (8.7% of the SNNPR population) based on the 2007 national census and have 10 Woreda, 1 town administration and 329 Kebeles.

The capital town of the Zone, Hosanna is located 230 km from Addis Ababa. The total area of the Zone is 5000 km^2 and has three climatic Zones. Dega (>2500 meters 24%), Woinadega (1500-2500 meters 65%) and Qolla (<1500 meters 11%). The economic livelihood of the people in the zone is based on livestock (14.6 %), crop production (77.4 %), trade (6.7 %) and other activities (1.25 %). Mirab-Badwacho Woredas is one of the 10 Woredas in the Zone. That, has 22 Kebeles with the total population 101, 603; Out of the total population, Male=49,772 Female= 51,831 and 98,668 (48,354 males and 50,314 females) live in rural areas, and also 23602 populations the females in child bearing age group and 20,016 non-pregnant women and have a total households 20,735. The study was conducted from February to June 2014.

3.3. Source population

All women in age group (18-49 years), which were non-pregnant and non-lactating, were the source population for this study in Mirab-Badewacho woreda.

3.4. Study Population

All non-pregnant and non-lactating women (18-49 years) who were actually participated during the study period

3.5. Inclusion and Exclusion criteria

Inclusion criteria

- ✓ Those non-lactating and non-pregnant women in age group (18-49 years) during the study period were included in the sample.

Exclusion Criteria

- ✓ Severally ill
- ✓ Amputated and crutch walking
- ✓ With less than 6 month of reside

3.6. Sample Size and Sampling techniques

3.6.1 Sample size

The sample size was determined using a single population proportion formula.

$$n = \frac{\left((z^{\alpha}/_{2})^2 \times p(1-p)\right)}{(d)^2}$$

$$n = \frac{\left((1.96)^2 \times .27(1-.27)\right)}{(0.05)^2} = 302.87 = 303$$

Assumptions;

n = the number of non-pregnant and non-lactating women's

Z = standardized normal distribution value at the 95% CL, which is 1.96

P =proportion of maternal thinness (chronic energy deficiency), by assuming national prevalence, 27% (16).

w = the margin of error, taken as 5%. With non-response rate of 5%; Therefore, sample size equals 318 and using a design effect = 2;

Total sample = 318 x 2 = **636**

3.5.2. Sampling procedure

Multistage sampling technique was used. In the first stage; from the total 22 Kebeles in the Woreda, 20 of them are rural Kebeles. Then from 20 rural, five Kebeles were selected using simple random sampling technique. In order to identify non-pregnant and non-lactating women, all households were taken and the samples were allocated from each kebeles by proportional to size allocation.

In the second stage, those, which were used as a sampling frame to identify the required sample size, were divided according to the size of the population of the study Kebeles. Then sample households were selected using systematic sampling technique. For the family that had more than one NPNL women one selected as an index using lottery method.

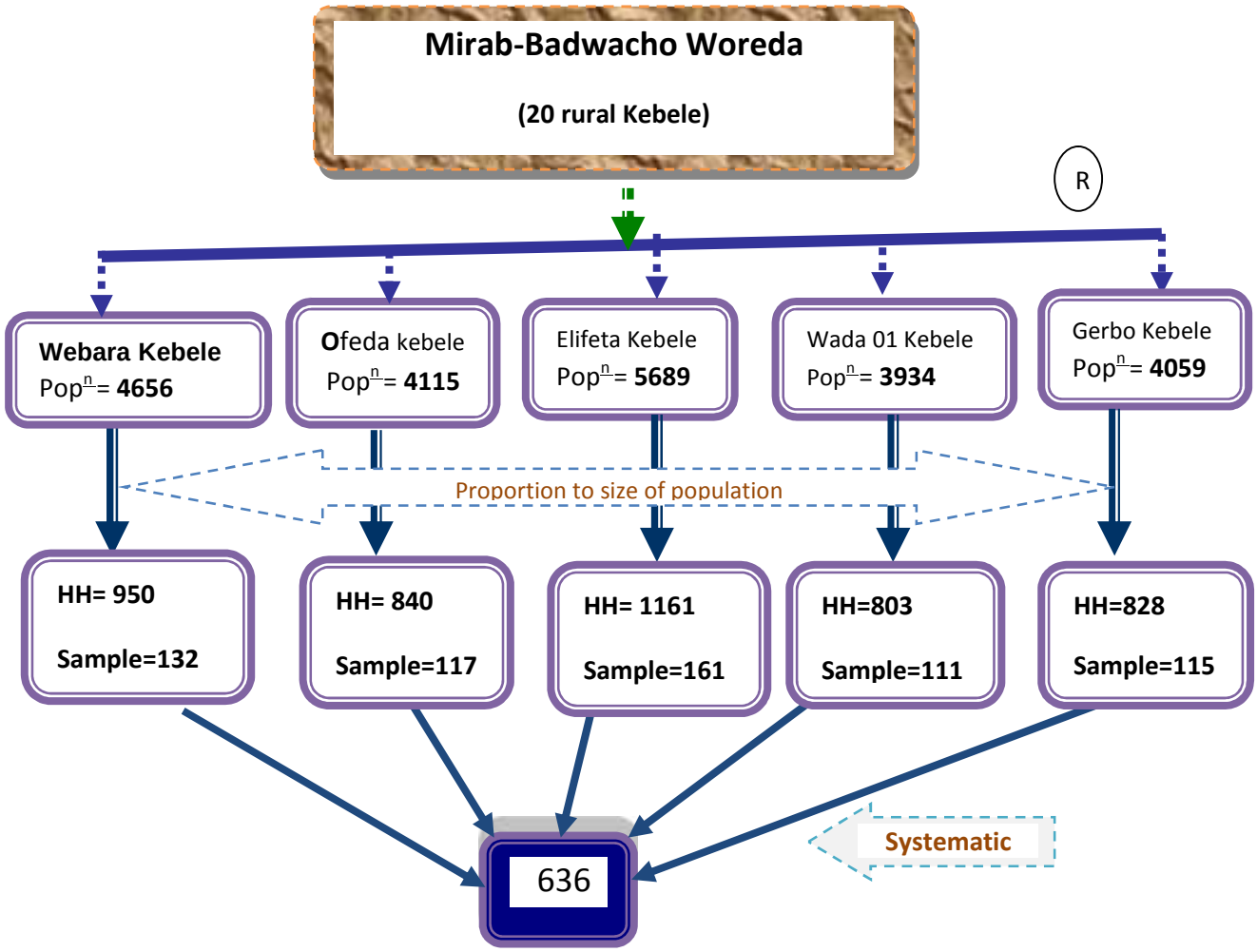

Fig.2 Schematic presentation of sampling procedure of Mirab-Badwacho Woreda

3.6. Variables of the study

Dependent variable

- Chronic energy deficiency

Independent variables:

Socio demographic and economic variables

- Age
- marital status
- Family income
- House hold head
- Family size
- Educational status of mother
- Educational status head of household
- Occupational status of mother
- Occupational status head of household

Maternal reproductive characteristics and illness

- Gravidity
- Parity
- Age of last child
- History of illness

Environmental variables

- Sources of drinking water
- Availability of home latrine
- Availability of home garden

3.7 Operational definitions

Chronic energy deficiency = Defined as BMI < 18.50 Principal cut-off points of WHO reference value (28).

Non-Lactating Mother: mother who is currently does not feeding breast milk for her infant/child.

Non-Pregnant woman: a woman who does see her menstruation within in the past one-month (history of last menstruation period less than one month)

Individual dietary diversity score: is acceptable indicator for adequate intake of micronutrients in developing countries. The classification based on median distribution of score(29).i.e.

Adequate= ≥ 4

Inadequate= < 4

Wealth index-is calculated using data on a household's ownership of selected assets, such as radio and telephone, etc. Generated with a statistical procedure known as principal components analysis, the wealth index places individual households on a continuous scale of relative wealth. Each household asset for which data were collected is assigned a weight or factor score generated through principal components analysis. The resulting asset scores standardized in relation to a standard normal distribution with a mean of zero and a standard deviation of one. These standardized scores were use to create the break points that define wealth tertiles consider as: - poor, middle and high (Annex-7).

3.8. Data collection tools and procedures

3.8.1. Data collection procedures

Data were collected using structured and pre-tested questionnaire adopted from EDHS and FAO, which was prepared in English and translated to Hadiyisa and Amharic and back to English. Ten BSc nurse data collectors and five HO supervisors were involved. Both data collectors and supervisors were recruited and trained for two days to serve as data collectors. The training focused on how to measure height to the nearest 0.1 cm, weight to the nearest 0.1 kg by using meter and digital bath balances and how to calibrate the instrument correctly by using well-known weighted material. Finally, the data collection techniques were going through by interview.

3.9. Data Quality control

Questionnaires were first prepared in English and then translated to Hadiyisa and Amharic and back to English to observe consistency. Trained data collectors collected data and pretesting of the instrument done before the actual data collection. For this: investigator, supervisors and data collectors took part in a pre-testing of the survey questionnaire among 5% of the study subjects in other kebeles of woreda similar to the study population and the necessary modifications and corrections were made.

BSc nurse data collectors and HO supervisors were trained on how to fill the questionnaires properly and how to use to digital balances and height scale in order to minimize errors.

Mother were well informed. The principal investigator and supervisors were made daily supervision during the whole data collection periods. Questionnaires were reviewed and checked; completeness, accuracy and consistency by supervisors and principal investigator. Corrective measures were taken after discussion with all the research team members in order to solve problems at the spot.

3.10. Data Processing and Analysis

After all the relevant data were collected, the data were coded on pre-arranged coding sheet by the principal investigator. Body mass index (BMI) was computed using weight divided by the height squares (Kg/m^2).

The data were carefully entered in to computer for beginning of analysis. The data entered to a computer by Epidata 3.5.3 & analyzed using SPSS window version 20. During analysis, missing values were handled not excluded in the analysis by checking repeatedly through data exploration.

In addition, descriptive statistics (frequency and table) was computed to describe study subjects. Bi-variate logistic regression analysis was used to determine association between dependent and independent variables. Independent variables with p-value less than 0.05 under 95% CI were considered as having significant association with the dependent variable and were reported using both p-value and odds ratio in the bi-variate analysis part.

All explanatory variables, which have significant association in bivariate analysis with p, value less than 0.2 were entered in to multi-variable logistic regression model in order to assess the independent predictors of chronic energy deficiency. The association between the dependent and independent variables was assessed using OR with 95% confidence interval, (C.I).Those variables with p-value less than 0.05 in the multi-variable analysis were considered as significant. Hosmer and Lemeshow goodness of fit test was used to check model fitness.

Wealth index analysis: Initially**,** reliability test was performed using the socioeconomic variables involved in measuring the wealth of the households and Cronbach's alpha was calculated to be 0.731. Wealth index was constructed using principal components analysis to determine the weights for the index based on information collected about several household durable assets and facilities. This index was divided into three categories (tertiles), and each household was assigned to one of these categories of household wealth index (poor, middle and high) (Annex-7).

4. Ethical consideration

Ethical clearance was obtained from institutional review board of the University of Gondar, institute of Public Health. Formal (official) letter of cooperation was written to Mirab-badwacho Woreda; and local authorities and concerned government bodies.

After getting permission from Kebeles leaders to conduct the study, informed consent was obtained from each study participants before interview the questionnaires, and takes the anthropometric measurements. Each respondent was informed about the objective of the study that it would contribute necessary information for policy makers and other concerned bodies. Any study subject who was not willing to participate in the study were not be forced to partake. They were also informed that all data obtained from them would be keep confidential by using codes instead of any personal identifiers and was mean only for the purpose of the study.

5. Results

5.1 Socio-demographic characteristics

A of 636 non-pregnant and non-lactating rural women were include in the study making the response rate 100%. The mean age of the respondents was 34.3 (SD ± 6.9) years. Majority (76.7%) of the respondents were protestant Christianity, catholic (11.5%), orthodox (9.9%), (1.9%) were hawariyat, and (62.4%) were married. Substantially number of respondents (75.3%) were Hadiya followed by (15.7%) were Kembata. The mean family size of the respondents was five (SD ± 2) and (69.5%) of the head of the household were male. Concerning the occupational status, (64.5%) of women were housewives, student (8.5%), farmer (7.4%), merchant (16%), daily labour (3.6%) and (57.1%) of women were illiterate. Household wealth index of the respondent was low (34.0%) and three hundred thirty-six (52.9%) were ate less than three meals per day in the past 24 hours **(Table-1).**

Table1. Socio-demographic characteristics of the study participants (n=636) in Mirab-Badewacho Woreda, 2014.

Socio-demographic variable	Frequency	Percent
Age mother		
18-25	38	6.0
26-35	325	51.1
36-49	273	42.9
Marital status		
Married	397	62.4
Divorced	42	6.6
Widowed	113	17.8
Single	53	8.3
Separated	31	4.9
Ethnicity		
Hadiya	479	75.3
Kembata	100	15.7
Wolayita	48	7.5
Amhara	9	1.5
Educational status of mother		
Illiterate	363	57.1
Primary	235	36.9
Secondary	28	4.4
Collage and above	10	1.6
Family size		
2-4 persons	264	41.5
>= 5 persons	372	58.5
Educational status of head of house hold		
Illiterate	305	48
Primary	257	40.4
Secondary	44	6.9
Collage and above	30	4.7
House hold wealth index		
Low	216	34.0
Middle	198	31.1
High	222	34.9

5.2 Maternal characteristics related to nutritional status of the respondent

From the total respondents, three hundred forty-one (53.6%) had three up to six pregnancies and majority (91.7%) of the respondents had greater than 24 months since the birth of last child. Two hundred thirty-three (36.6%) of the respondent had history of illness in the past one month. Three hundred thirty six (52.8%) ate less than three meal per day in the last 24 hours. (**Table2**).

Table2. Maternal health and feeding practices of study participants (n= 636) in Mirab-Badewacho Woreda, 2014.

Maternal Characteristics	Frequency	Percent
Number gravidity		
≤ 2 pregnancies	203	31.9
3-6 pregnancies	341	53.6
≥ 7 pregnancies	92	14.5
Number of children born		
≤ 2	240	37.7
3-6	324	50.9
≥ 7	72	11.4
Last child age		
<= 24 months	53	8.3
> 24 months	583	91.7
Women dietary diversity		
Inadequate	375	59.0
Adequate	261	41.0
Frequency of meals/day eaten in past 24 hrs		
< 3 meals	336	52.8
3 meals	254	39.9
4 meals	25	3.9
> 4 meals	21	3.4
History of maternal illness		
Yes	233	36.6
No	403	63.4
Stay of illness		
Less than a weeks	67	28.8
1-2 weeks	91	39.0
3-4 weeks	54	23.2
> 4 weeks	21	9.0

5.3 Nutritional status of the participant

Majority of the study participants five hundred seventy (89.6%) were above 145 cm height and sixty-six (10.4%) of them were below or equal to 145 cm. Moreover, four hundred thirty-six (68.6%) of the participants weights were greater than 45 kg and two hundred twenty-four (35.2%) of the respondents were chronic energy deficient. The mean body mass index of the respondents was 20.0 with standard deviation of 3.0 and four hundred twelve (64.8%) of respondents had body mass index was greater or equal to 18.5 kg per square meter (**Table3**).

Table3. Anthropometric status of the study participants (n=636) in Mirab-Badwacho Woreda, 2014.

Anthropometric variable	Frequency	Percent
Maternal height		
≤ 145 cm	66	10.4
> 145 cm	570	89.6
Maternal weight		
≤ 45 kg	200	31.4
>45 kg	436	68.6
Maternal BMI		
< 18.5 kg/m2	224	35.2
>= 18.5 kg/m2	412	64.8
Mean	20.0 (± 3.0)	

5.4. Environmental characteristics of the respondent

More than half of the respondents (67.1%) reported that, home gardening was available in their home. Majority of the respondents five hundred fifty-five (87.3%) of the respondents reported that, they had home latrine and the rest did not had latrine. Four hundred forty one (69.4%) of the respondents were used public tap water for drinking and one hundred eighty-two (28.6%) were used a spring water sources (Table4).

Table4. Environmental characteristics of the study participants (n=636) in Mirab-Badwacho Woreda, 2014.

Environmental variable	Frequency	Percent
Availability of home gardening		
Yes	427	67.1
No	209	32.9
Availability of home latrine		
Yes	555	87.3
No	81	12.7
Source of drinking water		
Public tape	441	69.4
Spring	182	28.6
Surface water	13	2.0

5.5 Food variety and feeding frequency

Based on list of food groups, which were used to measure foods eaten by the respondents over 24 hour before the day of survey; the median individual dietary diversity score was three out of nine food groups to measure women dietary diversity score. From the respondents of non-pregnant and non-lactating rural women, (59%) who ate low dietary diversity. I.e. ate less than four food group. The most commonly eaten foods by the respondent who were ate starch staples foods (cereal, tubers and roots) and (84.9%) of the respondents had eaten in the past 24 hour. The least food groups eaten by the respondents were organ meat (iron rich) (11.2%), egg (11.0%) and flesh meat (9.9%).

5.6. Prevalence's of chronic energy deficiency

The overall prevalence of chronic energy deficiency among non-pregnant and non-lactating (NPNL) rural women (18-49 years) in Mirab-Badewacho Woreda was 35.2% (95% CI: 31.5%, 38.9%).

5.7. Factors associated with chronic energy deficiency

In the biviarate logistic regression analysis, chronic energy deficiency was significantly associated with age of the respondent, family size, wealth index of the household, history of illness, source of drinking water, treating drinking water. In addition, hand washing after latrine, individual dietary diversity score and frequency of food eaten in the past 24 hours of the respondents.

But after controlling for possible confounders, the results of multivariate analysis reveals that age of the mother, family size, frequency of food eaten in the past 24 hr and treatment of drinking water were significantly and independently associated with chronic energy deficiency.

Women in age group 18-25 years were about two times more likely to have chronic energy deficiency as compared to women in age group 36-49 years (AOR=1.91, 95% CI: 1.06,3.46). Women who had greater than or equal to five family size were two times more likely to be chronic energy deficiency compared with respondents having 2-4 persons in the household (AOR=1.61, 95% CI: 1.14, 2.27). Those women who ate three meals per day were three times more likely to become chronic energy deficient when compared with four and more diet ate in the past 24 hours (AOR=3.18, 95% CI: 1.26, 8.05). Women who were drinking water without treating were two times more likely to be chronic energy deficient. when compared with those who were used treated water (AOR=1.84, 95% CI: 1.11, 3.13); and those who were have history of illness two times more likely chronic energy deficient when compared with those who had not (AOR=1.60, 95% CI: 1.13, 2.26)(**Table 6**).

Table 6: Association of some variables with the nutritional status (BMI) of the study participants (n=636) in Mirab-Badewacho Woreda, 2014.

Characteristics	Nutritional status (BMI) CED < 18.5	Normal >= 18.5	COR (95% CI)	AOR (95% CI)
Age group (18-49)	No (%)	No (%)		
18-25	20 (52.6)	18 (47.4)	1.75(0.99, 3.08)	1.91(1.06, 3.46)*
26-35	98 (30.1)	227 (69.9)	1.23(0.87, 1.74)	1.35(0.93, 1.91)
36-49	106 (38.8)	167 (61.1)	1.00	1.00
Family size				
2-4 persons	107 (40.5)	157 (59.5)	1.48(1.07, 2.06)	1.61(1.14, 2.27)***
>= 5 persons	117 (31.5)	255 (68.5)	1.00	1.00
Household wealth index				
Low	87 (40.3)	129 (59.7)	1.53(1.01, 2.26)	
Middle	69(36.5)	129 (63.5)	1.26(0.85, 1.88)	
High	68(30.6)	154 (69.4)	1.00	
Frequency of meals/day eaten in past 24 hrs				
< 3 meals	133 (39.6)	203 (60.4)	1.68(0.69, 4.06)	1.91(0.77, 4.77)
3 meals	71 (28.0)	183 (72,0)	2.84(1.15,6.97)	3.18(1.26, 8.05)**
4 meals	9 (36.0)	16 (64.0)	1.96(0.60, 6.38)	2.38(0.70, 8.02)
> 4 meals	11 (52.4)	10 (47.6)	1.00	1.00
Women dietary diversity				
Inadequate	144 (38.4)	231 (61.6)	0.71(0.51, 0.99)	
Adequate	80 (30.7)	181 (69.3)	1.00	
History of maternal illness				
Yes	98 (42.1)	135 (57.9)	1.59(1.14, 2.23)	1.60(1.13,2.26)***
No	126 (31.3)	277 (68.7)	1.00	
Source of drinking water				
Public tape	142 (32.2)	299 (67.8)	1.00	
Spring	75 (41.2)	107 (58.8)	1.66(0.54, 5.15)	
Surface water	7 (53.8)	6 (46.2)	2.45(1.03, 7.44)	
Treating drinking water				
Yes	33(45.8)	39(54.2)	1.00	1.00
No	191(33.9)	373(66.1)	1.65(1.00, 2.71)	1.82(1.11, 3.08)*
Hand washing after latrine				
Yes	105(39.8)	159(60.2)	1.40(1.01, 1.95)	
No	119(32.0)	253(68.0)	1.00	

NB. ******* *P-value is significant at < 0.05* ******** *P-value is significant at < 0.01*
********* *P-value is significant at < 0.001* *Backward LR methods was used*

6. Discussion

Chronic energy deficiency, is a common problem affecting all women especially who live in the rural area of developing countries? In Ethiopia, many studies were conducted to identify the extent and consequence of under nutrition in different age groups. However, nutritional status of non-pregnant and non-lactating women, were not well addresses. Therefore, this study disclosed the prevalence and associated factors of maternal chronic energy deficiency among rural women in Mirab-Badewacho Woreda.

The prevalence of chronic energy deficiency (BMI less than 18.5 kg/m^2) in the study area was 35.2% (95% CI: 31.5%, 38.9%). This finding prevalence is higher than when compared with the previous studies conducted in east Africa which was 12% of non-pregnant and non-lactating women were chronic energy deficient (BMI < 18.5) in Zimbabwe (26). This high difference might be due to the differences of study period. Moreover, in Ethiopia the significant of low body mass index was from March to April (27). This higher prevalence may be due to geographical difference. In addition, this is higher than study conducted in Bangladesh (28.5%)(9). This higher prevalence difference might be due to seasonal variances and differences of study period. The other cause of the difference probably, the study area is also malaria hot spot, so this is also causes the study subject to become malnourished and chronic energy deficiency.

Moreover, the prevalence was also higher than study conducted in India in the village of Bashahpur; Gurgaon that was 25% of NPNL women were chronic energy deficient (3). This study difference may be due to seasonal, study period and geographical location differences. In another hand, this study was constant with the study conducted in Muheza rural area of India, which was 36% of NPNL women (20).

Non-pregnant and non-lactating rural women in the first category of age group 18-25 were two times more likely to be chronic energy deficient than the age group 36-49 years women. This result similarly with the studies in Ghanaian women(24). This may be due to high-energy demand for fast growth, physical activities and mostly workloads higher in the younger women than the older once.

Women who had family size less than to five were two times more likely to be chronic energy deficient when compared with women having greater than or equal to five family sizes. This may be due to work sharing in the family member, and income level increases by participating in different income source; especially in low socio-economical status rural households.

Non-pregnant and non-lactating rural women frequency of meal per day eaten in the last 24 hours three times per day were three times more likely to be chronic energy deficient when compared with those who ate four and above times per day. Even if they take a meal three times a day, they become chronic energy deficient, BMI less than 18.5). This may be resulted due to the lack of proper food diversification, preparation, handling system and the facts of meeting nutrient requirment. Inadition that, those who were feed a meal three times aday previously in the data collection date were chronic energy deficient may be women who were not feed always three times in another day.

Women who had history of illness were two times more likely to be chronic energy deficient when copared with women didn't have a history of illness. This is simillar with the study conducted in India and on global hunger defination(3, 4). This may be due to the fact that, illness cause appetite loss and inapproprate nutrient intake which results chronic energy deficiency. Inadition that, the study area is malaria hot spot, so this is also the main causes for maternal chronic energy deficiency.

Non-pregnant and non-lactating rural women in the study area who does not treat water for drinking purposes were two times more likely to be chronic energy deficiency (body mass index less than 18.5 kg/m^2) when compaired with women who were treating water for drinking. This is simillsr with the study in northern Nigeria about the importants of water to reducing a broad range of infections and improving nutritional status of women(23). In addition, this was due to the fact that treating water reduces the exposure of water born diseases and occurrences of diarrheal diseases.

7. Strengths and Limitation of the study:

The study is limited to anthropometric measurements. It shares the limitation of cross sectional study. This study incorporates dietary diversity, which is proxy indicator of micro nutrient adequacy.

8. Conclusion:

The finding shows that the prevalence of chronic energy deficiency was found to be high prevalence in the study area according to the WHO cut of values for public health significances. Age of mother, family size, and history of illness, feeding frequency in the past 24 hour in addition to treating water for drinking were significantly associated with non-pregnant and non-lactating maternal chronic energy deficiency.

9. Recommendation

To local agriculture bureau

- promote availability of home gardening in all household

To local water bureau

- Strength water treatment practices in the community

To local health service providers

- Encourage mothers to use family panning

To woreda health office, Zonal health department and Regional health bureau:

- Incorporate non-pregnant and non-lactating women nutrition in their plan

To other relevant body

- NGOs who work in this area recommended training and making social mobilization on optimal attention of NPNL women's.
- Further studies that mainly address for the area prevalence and associated factor of NPNL women's

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11. ANNEXES

11.1. Annex 1. Consent form

Informed consent forms for non-pregnant and non-lactating women who are living in Mirab-badwacho Woreda and who will be inviting to take part the study research.

Title of the research: - Prevalence of chronic energy deficiency and associated factors

Principal investigator: - Sisay Setegn Amare

Advisor: - Mrs. Azeb Atenafu and Mr. Mulat Gebrehiwot

Organization: - University of Gondar, Collage of Medicine and health sciences

Sponsor:-

Part I. Information sheet

Our names are _____ and _____ we are doing a research on non-pregnant and non-lactating women. We will give you information and invite you to be part of this research. Before deciding to be a part of this research you can talk to anyone, you feel comfortable with about the research.

If there is any word that you do not understand, while I am giving information please stop me and ask me and I will explain to you.

If you have any question in later time you, can ask us by using our phone number. Which is_____ or you can ask “Sisay Setegn” the principal investigator of the research through this phone number= 0913303280.

Purposes of the research

This research used to assess whether non-pregnant and non-lactating women are chronic energy deficient or not. If they are chronic energy deficient, determine what the main determinant for their chronic energy deficiency. Because maternal chronic energy deficiency before pregnancy and lactation period resulted due to, sever protein energy malnutrition and this leads to maternal complication in the lately life cycle and leading to death of mothers and children’s.

Therefore, if the non-pregnant and non-lactating mothers are chronic energy deficient in this area. This study will help to different organizations to design and plan an intervention strategy.

Types of the research, duration, procedure and participant

This research will involve non-pregnant and non-lactating women like you. If you agree to take apart the research, you will be weigh your weight and measure your height and then ask some information you and your family based on the questionnaires. The overall time will approximately 20 minutes.

We are inviting all non-pregnant and non-lactating women to take part this study.

Voluntary participation

Your participation in this research is voluntary. It is your choice where to participate or not. Whether, you participate or not there will not be any negative impact. You may change your mind later and stop participation even if you agree now.

Confidentiality

In this research; we will ask some question about you and your family and measured your weight and height. The information that will collect from this research will be keep confidentially. Information that collected about you and your family will kept in secured way. Any information about you and your family have a number in study of the name identifiers. It will not share with any one if you are chronic energy deficiency or not.

Benefit

Your participation in this research may not directly provide you a certain benefit as an individual. It may benefit for all non-pregnant and non-lactating mothers in the region as well as in the country. If you become too chronic energy deficiency, we will advice how to prevent further chronic energy deficiency and refer to health facility to additional care.

Risk and side effect

Being a part in this research, there is not any risk and side effect.

Reimbursement, incentive, or participation

If you agree to participate this research you will not provided any incentive or payment.

Right to refuse or withdraw

You do not have to take a part in this research if you do not wish to do so and refusing to participate will be will not affect you. You may stop participation in the research at any time that you wish without losing any time that you wish without losing any thing. Refusing or withdrawing the participation of this research will not affect you in any way.

Whom to contact

This research reviewed and approved by the ethical committee of the University of Gondar. If you wish to find about more; or if you wish to find about more or if you wish ask questions now or later you can use the contact addresses below.

1. University of Gondar : Mrs. Azeb Atenafu and Mr. Mulat Gebrehiwot

   Tell: - _____

   P.O.Box: - _____

   Fax: _ _____

   E-mail: - _____

2. Investigator:- Sisay Setegn Amare

   Tell: - *0913303280*

   P.O.Box: - *108, Hosanna, SNNPR-Ethiopia*

   Fax: _*0465554492*

   E-mail: - *sissetegn@yahoo.com*

11.2. Annex 2: Consent statement

University of Gondar College of medicine and health science Institute of public health

Questionnaires to assess the prevalence of chronic energy deficiency and associated factors among non-pregnant and non-lactating women in Mirab-badwacho Woreda, Hadiya zone, 2014

Hello! My name is _____.I am here on behalf Sisay Setegn, second year student in masters of Science in applied human nutrition in university of Gondar, collage of medicine and health science and institutes of public health.

I have identified you as a study participant hoping that you would be willing to help provide me with some information. I have several questions, which I would like to ask you, if you have the time and are willing. The questionnaires include socio demographic factors, eating habit, illness and workloads. This will help to prevent under nutrition among non-lactating and non-pregnant women in Mirab-badwacho Woreda based on the information obtained from you.

All information you provided will kept strictly confidential. I will not include any identifiers, such as your name or exact address. Only honest answers would contribute to improvement of health plan on improving women nutrition and prevention of chronic energy deficiency. Your role in the success of the research is important and I appreciate your contribution to the research. Your participation is voluntary and you will not force to answer any to answer any question, which you do not want to. If you fill discomfort, please fill free to stop any time you want. The question will take about 20 minutes.

Would this be okay with you?

1. If yes, continue
2. If no, skip to the next participant

Data collectors name _____ signature _____date_____

Name of supervisor---------- signature----------

Thank you!!!

11.3. Annex 3: Questioners

TABLE .3 Questioners to assess the prevalence of chronic energy deficiency and associated factors among non-pregnant and non-lactating women in Mirab-badwacho Woreda, Ethiopia, 2014.

Sr. No	Questions	Response	Code
1. Socio-demographic characteristics			
1.	Age	---------- years	
2.	Marital status	1. Married 2. Divorced 3. Widowed 4. single 5. Separated	
3.	Religion	1. Orthodox 2. Muslim 3. Protestant 4. Catholic 5. others, specify----------	
4.	Ethnicity	1. Hadiya 2. Kembata 3. Wolayita 4. Amhara 5. Others, specify----------	
1.5.	Educational status of mother	1. Illiterate 2. Primary school (1-8) 3. Secondary school (9-12) 4. Collage and above	
1.6.	Occupational status of mother ?	1. House wife 2. Student 3. Farmer	

		4. Merchant 5. Daily lever	
1.7.	Head of the household ?	1. Mother 2. Father	
1.8.	Educational status of the head of the households ?	1. Illiterate 2. Primary school (1-8) 3. Secondary school (9-12) 4. Collage and above	
2. Family income (wealth index)			
2.1.	Does your household have a radio?	1. Yes , ___ (number) 2. No	
2.2.	Does your household have a mobile telephone?	1. Yes , ____ (number) 2. No	
2.3.	Does your household have a chair? ‘	1. Yes , ___ (number) 2. No	
2.4.	Does your household have a bed with mattress?	1. Yes , ___ (number) 2. No	
2.5.	Does your household have a table?	1. Yes , ___ (number) 2. No	
2.6.	What type of fuel does your household mainly use?	1. Wood 2. Animal dung 3. Kerosene 4. Other, specify_____	
2.7.	Do you/ your household own any livestock, herd, other farm animals or poultry?	1. Yes 2. No, If no skip to Q_n. **2.10**	
2.8.	How many of the following animals do in your household? (if none put zero) a) Milk cows or ox ?	1. Yes , ___ (number)	

		2. No	
	b) Goats or sheep ?	1. Yes , ___ (number) 2. No	
	c) Beehives ?	1. Yes , ___ (number) 2. No	
	d) Chickens ?	1. Yes , ___ (number) 2. No	
	e) Horses, donkeys, or mules ?	1. Yes , ___ (number) 2. No	
2.9.	How many (local units) of agricultural fertile land do have for members of this household own?	_____ hect.	
2.10.	How much crop do you produce annually		
	• Wheat	1. Yes , ___ (Kuntal) 2. No	
	• Barely	1. Yes , ___ (Kuntal) 2. No	
	• Teff	1. Yes , ___ (Kuntal) 2. No	
	• Maize / corn/	1. Yes , ___ (Kuntal) 2. No	
	• sorghum	1. Yes , ___ (Kuntal) 2. No	
	• Other _____	1. Yes , ___ (Kuntal) 2. No	
3. Availability of home gardening			

3.1.	Do you have home gardening?	1. Yes 2. No , If no skip to Q_n. **4.1**	
3.2.	What do you grow in it?	1. Vegetable 2. Fruit 3. Both 4. Other, specify_____	
3.3.	For what purpose do you grow the vegetables and/or fruit?	1. For selling 2. For home consumption only 3. For both purpose 4. Other, specify_____	

4. Eating habit: - In the past 24 hours, if the participant consumed at least one of the food group from the list, write "1" in the box and if not write "0"

	Food group	Examples	**yes=1 no=0**
4.1.	cereals	corn/maize, wheat, sorghum or any other grains or foods made from these (e.g. bread, ejera,	
4.2.	Vitamin A rich vegetables and tubers	pumpkin, carrots, or sweet potatoes that are orange inside	
4.3.	Tubers and roots	potatoes, beetroot, cassava, Kocho (inset) or other foods made from roots	
4.4.	Dark green leafy vegetables	dark green/leafy vegetables, cabbage, *etc.*	
4.5.	Other vegetables	other vegetables (e.g. tomato, onion)	
4.6.	Vitamin a rich fruits	ripe mangoes, ripe papaya	
4.7.	Organ meat (iron rich)	liver, kidney, heart or other organ meats foods	
4.8.	Flesh meats	beef, lamb, goat, chicken	
4.9.	Eggs	chicken, egg	
4.10.	Legumes, nuts	beans, peas, lentils, nuts	
4.11.	Milk and milk products	milk, cheese, yogurt or other milk products	
4.12.	Oils and fats	oil, fats or butter added to food or used for cooking	
4.13.	Sweets	sugar, honey	
4.14.	Spices, beverages	Spices (black pepper, salt), coffee, tea, alcoholic beverages, tela or borde	
4.15.	In the past 24 hours, how many times did you serve meals in a day?	1. Less than three meals 2. 3 meals 3. 4 meals 4. > 4 meals	

5. Access to safe drinking water			
5.1.	Where did you get water for drinking?	1. Public tap 2. Spring 3. Surface water 4. Other, specify _____	
5.2.	Do you treat water for drinking?	1. Yes 2. No ,If no skip to Q_n. **5.4**	
5.3.	How do you treat water?	1. Boiling 2. Filter through a cloth 3. Other specify _____	
5.4.	How long does it take to go there, to get water, and come back?	_____ Minute	
5.5.	How many times travel to fetch water every day ?	1. Once a day 2. Twice a day 3. Three and more times	
6. Availability of latrine facility			
6.1	Do you have a toilet facility in your home?	1. Yes 2. No	
6.2	If you do not have a toilet in your home, where do you use?	1. Public toilet 2. Open field 3. Other,specify_____	
6.3	Do you wash your hand after latrine?	1. Yes 2. No	
7. Maternal care			
7.1.	Number of gravidity ?	_____	
7.2.	Number of parity ?	_____	
7.3.	Age of last child ?	_____ Month	
7.4.	Number of family members in the household ?	Male__ Female__ Total.___	

8. Medical history			
8.1.	Have you seen menstruation in the last one month?	_____	
8.2.	Do you have a history of illness in the past one month?	1. Yes 2. No , If no, skip to Q_n. **9.1**	
8.3.	If yes, types of illness?	_____	
8.4.	For how many days did the illness stay?	1. Less than a weeks 2. 1-2 weeks 3. 3-4 weeks 4. Other _____ weeks	
8.5.	When do you do recovered from the illness?	1. Within this week 2. Before two week 3. Before three week 4. Other specify_____	
9. Anthropometric			
9.1.	Weight in kilogram (round to 0.1 kg)	_____ Kg	
9.2.	Height in meter (round to 0.1 cm)	_____ Meter	

11.4. ANNEXES 4: Hadiyyissi Xa'imcha

Gonidoree Univerisitte'e

Mediisinne Fayaa'oom Saayinisi Collejja

Minadaphi Faya'oom Eegach Losa'in Baxxancha

Xa'imcha:-Mirab-badawachone Hadiy Zonane Woron gatene 2006 hinchone lamphore ihubee tee'im ichisobee amooh wichimoom hinikaane ihuda'e tee'im wichimoom mahine warodaa'e annan isakaa'a sorobiminaa

Xa'immakam ogoora enkinisancho

Hallo Isum:_____.Ann Sisaay Sixxagn haramancho. Ixxi Gonderi unverisitee'ene,Midiisine Fayaa'om Sayinsi Colejane, Minadaphi fayaa'om egecha Losaa'in baxxanchane Apilayidi Humaani Nutirishinane Losanchoo.

Ku xa'imchi annanan xaphouwaa qaphakoohane.KB:Maan duhaa'a,Itakam qankaa, Jabi bikinaa ehisam baxxi lophim bikina.Ka dabachim hundoomim matim laa'o be'isaa maxaamakoohane.ki sum ka xamichane kitabamoyoo.Ati hasitalensi xamicha dabarima sabenami xanitotoo tee'im ayy amane utta fiteena xanitotoo.Ihukarem,ati uwitoo danam dabach ka xaminom xamichina lobakata haramokoo,.

Nesse bashilisa galaxinomomo ka soorobimane yoonitakoo'o bikiinaa.Ku xamichim 20 daqiq afeebe'e xamicha xaminoomo.Itantaako'o,dabacha uwitaake'enna?

1. **Oyaa**
2. **Gatonna**

1. Dataa'a wixaa'im bala:- ----------
2. Dataa'a wixaa'anch sum: ----------Furmaa'a----------
3. Dadessanch Sum: ----------Furmaa'a----------

Kitabantoo'i bikkina Lobakatta galaxxinomoo!

11.5. Annex 5. Xa'imcha:-

Table3: Mirab -badawachone Hadiy Zonane Woron gatene 2006 hinchone lamphore ihubee tee'im ichisobee amooh wichimoom hinikaane ihuda'e tee'im wichimoom mahine warodaa'e annan isakaa'a sorobiminaa

Xigoo	Xamicha	Dabachaa	Higonaa
5.	**Gatti ogoraa annanato xamoo xa'imichaa**		
1.1.	Kihi umuri mee'i hincho?	----------hincho	
1.2.	Ebaqaanchi duhaa hinkidete?	1. Mine istoohane 2. Bubesancho 3. Gonch lehakokootane 4. Mine istoobee'etane 5. Anan ikohoohane	
1.3.	Kihi amaanat mahaa?	1. Ortodoxssa 2. Muslima 3. Protestantaa 4. Catoolika 5. .Mulanee,chakise---------	
1.4.	Hinka'a shumoo'o ikoo?	1. Hadiyaa 2, Kembata 3, Wolayita 4, Amhara 5, Mulanee, chakise----------	
1.5.	Amaaki lossani duha'i mahaa	1. Maham losoo bee'ane 2. Lux gabala(1-8) 3. Lam gabala(9-12) 4. Colejja te'im hananete	
1.6.	Amaak baax maha?	1. Min amaa 2. Lossancho 3. Abulla	

		4. Dadarro 5. Ball baxxo,	
1.7	Min gasanch ayetee?	1. Amaa 2. Anna	
1.8.	Min gasanchik losaan duha maha?	1. Losan bee;ane 2. Luxx gabala (1-8) 3. Lam gabala (9-12) 4. Colejja te'im hananete	
2. Abaroos amaxxa (wealth index)			
2.1.	Kin minene radooi yoo?	1. Oyaa , _____ (xigoo) 2. Bee'e	
2.2.	Kin minene silk (moobale) yoo?	1. Oyaa , _____ (xigoo) 2. Bee'e	
2.3.	Kin minene barichum yoo?	1. Oyaa , _____ (xigoo) 2. Bee'e	
2.4.	Kin minene aliig firash yoo?	1. Oyaa , _____ (xigoo) 2. Bee'e	
2.5.	Kin minene xaraphez yoo?	1. Oyaa , _____ (xigoo) 2. Bee'e	
2.6.	Kin minene hundi amaneme girinaa awaaxitakamook maha?	1. Haaka te'im qoxaxaa 2. Kobootaa 3. Butaagazaa 4. Mulane,chakise_____	
2.7.	Kin minene te'im kina dinaat kobishina lalew, bul mirgo'uw yoo?	1. Oyaa) 2. Bee'e, Aa'e ihukalles **Xig2.10** hige	

2.8.	Ka awoon sidamo dinatuwinse hinkan kinmine hee'o? (bee'alense Zero xaphe) a) Axxi laar te'im mirgo'uw?	1. Oyaa , _____ (xigoo) 2. Bee'e	
	b) Felaa te'im gerebi?	1. Oyaa , _____ (xigoo) 2. Bee'e	
	c) Dish seech?	1. Oyaa , _____ (xigoo) 2. Bee'e	
	d) Gamaam?	1. Oyaa , _____ (xigoo) 2. Bee'e	
2.9.	Abul ulli hararoom (hekitaren?	_____ hekitarane	
2.10.	Hinchone hinkan hurbaata sidoo? • Arasaa	1. Oyaa , _____ (Kuntalane) 2. Bee'e	
	• Soo'o	1. Oyaa , _____ (Kuntalane) 2. Bee'e	
	• Xafee'e	1. Oyaa , _____ (Kuntalane) 2. Bee'e	
	• Boqoola	1. Oyaa , _____ (Kuntalane) 2. Bee'e	
	• Sarataa	1. Oyaa , _____ (Kuntalane) 2. Bee'e	
	• Muleka,chakise____	1. Oyaa , _____ (Kuntalane) 2. Bee'e	

3. Min heegeqi/Dubi kashuwi bikina			
3.1.	Dubi/heegeqi kashuwi yahoon	1. Oya 2. Aa'e	Aa'e ihukalles **Xig** 4.1 hige
3.2.	Dubi kashuwi tee'im mishuw mamaah yoo?	1. Dubi kashaa 2. Mishuwa 3. Lamome 4. Mulakin, chikise_____	
3.3.	Dubi kashuwa maha awaddi bikina li'isakamook?	1. Bitinaa 2. Min ichina xale'ina 3. Lamem awaadina 4. Mulakin, chikise _____	
4. Itim duhaa'a Higu 24 saa'x woorene kan worone chakisamu hurbatuwikaa hoofe'u beyoone mato Itahine,eya ihukalense "1" saxinane kitaabe,aa'e ihukalense "0"kitaabe.			
	Hurbaax Galicha	Kobishaa	eya=1 aa'e=0
4.1.	Wix hurbata	Boqolla, arasaa,sarata te'im ka hanan chakisamukan (K.B. daboo, ejera,)	
4.2.	Vatamin A yoo dub kashuwinse	Dabakula,karrota,sukar dincho	
4.3.	Lugumo isoo hurbatuw	Dincho,kashar lugumo,casapha, wasaa te'im mulikenuwam	
4.4.	Dub kashuwinse	Shanaa,te'im mulikenuwan	
4.5.	Muli dub kashuwinse	Timatimaa,shunkurutaa	
4.6.	Vatamin A amadu mishuwinse	Mango'o,papaaya	
4.7.	Maara (arena amadu maara)	Afare,muroo,wodano te'im mulikeno	
4.8.	Harech maara	Mirgo, gereba felaa, antabaa maara	
4.9.	Kunqaa	Antaba,kunqaa	
4.10.	Baakela,otongoro	Baakela,gitee'e, otongoro	
4.11.	Adoo te'im axxi mishaa	Adoo , salalo, te'im mule axxi mishaa	

4.12.	Zayita,di'iraa	Zayita, di'ira te'im buroo	
4.13.	Xee'o luwisee	sukara, maraboo	
4.14	Agakam luwinsee	Bunna,shaa'e,haraqee,xalaa,bordee	
4.15	Higu amanene 24 saa'ax worone mee'I amane hurbataa itaa?	5. Saasi aman hofooka 6. Saasi amane 7. Foor amane 8. Foor amane lobooka	
5. Muchur agakam woo'o sidakam ogora			
5.1	Woo'o hanisee ebakkamok?	1. Boonoise 2. Buise 3. Lerinse/daanba 4. Mulene,chikise _____	
5.2	Woo'o muchusitakaamo?	1. Oya 2. Aa'e	Aa'e ihukalles **Xig** 5.4 hige
5.3	Woo'o ihukalense maahine muchusitakamo?	1. Hufaa'imine 2. Haabiline mararma 3. Woo'o agaraa awaxximine 4. Mulene,chikise _____	
5.4	Woworoo marim waarim hinkin amane masoo ?	_____daqqiqa	
5.5	Mati balane meei amane woo'o ebakamoo?	1. Bala mati amane 2. Bala lam amane 3. Bala sasi amane tee'im	
6. Shumine yoo'isaa moo'iso baxxancha/facility			
6.1.	Kin minene shumin yoohone?	1. Oya 2. Aa'a	
6.2.	Dabach Aa'a ihukalesi haanone shumine	1. Minadaph shumine	

	awaaxitakaamok ?	2. Haqoorone 3. Mulane,chakise_____	
6.3.	Shumine lasoone anga ansha'itoo ?	1. Eyaa 2. Aa'e	
7. Maternal care/Amoo bikinaa chakisha			
7.1.	Lamforom xig?(Number of gravidity)	_____	
7.2.	Foori qaramu chiluw xig? (Number of parity)	_____	
7.3.	Lasancho qaramu chili umur? (Age of last child)	_____ Aganane	
7.4.	Min abaroos hinkana?	Gon___ Ment___ Hundomim___	
8. Higu aman jabi bikina chakisha/Medical history			
8.1.	Higu maat agan worone laanid xuraa molaa?	_____	
8.2.	Higu mati agaan woorone xista/jabitaa helitoo?	1. Oya 2. Aa'a; ihukalles **Xig** 9.1 hige	
8.3.	Eyaa,ihukalense jabo hagara chakise?	_____	
8.4.	Mee'o balaa xisine/jabine insella helito?	1. Mati santi woroone 2. 1-2 santa 3. 3-4 santa 4. mulane _____ santa	
8.5.	Hinkaane balaa ihaa insisee kilitaanse?	1. Ka sant woorone 2. Lam sant ilage 3. Saas sant ilage 4. Mulane,chakise_____	
9. Anitrophometire			
9.1.	Gurat mee'o	_____ Kg.	
9.2.	Ulich mee'o	_____ Metirane	

11.6. Annex 6:- አማረኛ መጠይቅ

9.6.1. Annex 1. የስምምነት ቅጽ

በምዕራብ ባድዋኞ ወረዳ በሚገኙ ባላረገዙ እና በማያጠቡ እናቶች ላይ ለሚደረገዉ ጥናት በፕሮጀክቱ ለመሳተፍ ወይም ላለመሳተፍ የሚያስችል ግልጽ የስምምነት ቅፅ.

የምርምር ፕሮጅክቱ ስም፡- ክብደታቸዉ ከቁመታቸዉ ጋር ሲነጻጸር አነስተኛ የሆኑትን ሽፋን እና ተጓዳኝ ምክኒያቶችን መለየት

ዋና ተመራማሪ: - ሲሳይ ሰጠኝ አማረ

አማካሪዎች: - ወ/ሮ . አዜብ አጥናፉ እና አቶ ሙላቱ ገብረሂዎት

የድርጅቱ ስም: - ጎንደር ዩኒቨረሲቲ የማህበረስብ ጤና አጠባበቅ ኢኒስቲቲዩት

የስፖንሰር ድረጅቱ ስም:- ዋና ተመራማሪ

Part I. የስምምነት ቅፅ መግቢያ

ይህ የስምምነት ቅጽ አሁን እርሰዎ እንድሳተፉበት የምንጠይቀዎትን የምርምር ጥናት የሚያብራራ ነዉ። በዚህ ጥናት ለመሳተፍ ከመዎሰንዎ በፊት የህንን ቅጽ በጥንቃቄ በማንበብ ጥያቄዎች ካሉዎት ይጠይቁ። እባከዎ በዚህ ጥናት መሳተፍ ከጀመሩ በኃላም ሆነ በማንኛዉም ጊዜ ጥያቄዎች ካሉዎት መጠየቅ ይችላሉ።

የምርምር ፕሮጀክት ዓላማ

የዚህ ምርምር ፕሮጅክት ዓላማ የማያጠቡ እና ያላረገዙ እናቶች ክብደታቸዉ ከቁመታቸዉ ጋር ሲነጻጸር አነስተኛ መሆኑን ወይም አለመሆኑን ከማሳየት ባለፈ ለመሆናቸዉ ወየም ላለመሆናቸዉ ዋና ምክኒያቶችን ጭምር ያሳያል። ጥናቱ ያስፈለገበት ምክኒያትም ብዙ እናቶች ከማረገዛቸዉ እና ከማጥባታቸዉ በፊት የሚደረግላቸዉ የአመጋገብ ስርዓትን በተመለከተ በቂ ባለመሆኑ የሚደርሱ መሰረታዊ ችግሮች ለመቅረፍ፤ በተለይም ከትዉልድ ትዉልድ የሚተላለፍ የምግብ እጥረት ችግርን ለመቅረፍ የሚኖረዉ ሚና ከፍያለ ይሆናል።

ስለሆንም በወረዳዉ የሚገኙት ጥናቱ በሚካሄድበት ወቅት የላረገዙ እና የማያጠቡ እናቶች ክብደት አነስተኛ ከሆነ፤ የተለያዩ ጉዳዩ የሚመለከታቸዉ አካላት ተገቢዉን እቅድ በማዉጣት አስፈላጊዉን እርምጃ አንድወስዱና በሌሎች አካባቢ በሚገኙ እናቶች ጭምር አስፈላጊዉን የስነ-ምግብ ተግባራት እንድተገብሩ ያስችላል።

የጥናቱ ዓይነት፤ የሚወስደዉ ጊዜ፤ የአሰራር ሂደት እና የጥናቱ ተሳታፊዎች

ይህ ጥናት የማያጠቡ ያላረገዙ እናቶች እድሚያቸዉ ከ 18-49 የሆኑትን ያካትትታል። እርሰዎ የጥናቱ አካል ለመሆን ከተስማሙ በጥናቱ አላማ መሰረት የተወሰኑ ጥያቄዎችን ከጠየቅነዎት በኃላ፤ ክብደተዎን እና ቁመተዎን እንለካለን። በጥናቱ መጠይቅ መሰረት ከርሰዎ ጋር ለመቆየት የሚፈጀዉ ጊዝ ባማካይ 20 ደቂቃ ነዉ።

ሁሉም ጥናቱ በሚካህድበት ጊዜ ያላረገዙ እና የማያጠቡ ዕድሚያቸዉ 18-49 ዓመት የሆኑ በሙሉ የዚህ ጥናት አካል እንድሆኑ ተጋብዘዋል።

ፈቃደኝነት

እርሰዎ በጥናቱ ዉስት መሳተፍ ካልፈለጉ መሳተፍ የለበዎትም፡፡ ከፈለጉ ይሳተፉ ካልፈለጉ ደግሞ ባለመሳተፈዎ ምንም ዓይነት ተጽዕኖ አይደርስበዎትም፡፡. በጥናቱ እየተሳተፉ እያሉም ቢሆን ባማንኛዉም ጊዝ ያልገባዎትን ጥያቄ የመጠየቅ ወይም አቋርጠዉ የመዉጣት መብተዎ የተጠበቀ ነዉ፡፡

ሚስትጥር መጠበቅ

በዚህ ጥናት መጠይቅ መሰረት የእርሰዎን እና የበተሰበዎን መረጃ፤ በተለይም የእርሰዎን ክብደት እና ቁመት እንለካለን፡፡ ሆኖም ግን የተሰበሰበዉ መረጃ በሚስጥራዊነቱ ተጠብቆ ይቀመጣል፡፡ ከርሰዎ እና ከቤተሰበዎ የተሰበሰበዉ መረጃ ሚስጥራዊነቱ የተጠበቀ ይሆን ዘንድ ምንም አይነት ገላጭ ነገሮች (ለምሳሌ፡- ስም) አይጠቀስም፤ ምንም ይሁን ምን ከርሰዎ የሚገኘዉ ዉጤት ለሌላ ሰዉ አይገለጥም፡፡

የሚጠበቁ ጥቅሞች

በጥናቱ ላይ መሳተፈዎ ለእርሰዎ ቀጥተኛ የሆነ ጠቀሜታ እንደግለሰብ ላስገኝለዎት ይችላል፡፡ ሆኖም ግን የእርሰዎ መሳተፍ ለሌሎች በዞኑ ወይም በክልሉ፤ ብሎም ባገሪቱ ለሚገኙ የማያጠቡ እና ያላረገዙ እናቶች ላይ ለሚደረገዉ ተገቢ የአመጋገብ ስርዓት ጉልህ ሚና ይኖረዋል፡፡ በጥናቱ ወቅት እርሰዎም ክብደተዎ ከቁመተዎ ጋር ሲነጻጸር አነስተኛ ከሆነ ወደ ጤና ተቋማት እንድሄዱ እና ተገቢዉን የምክር እና የህክምና አገልግሎት እንድያገኙ እንመክረወታለን፡፡

አደጋ ወይም አለመመቸት

የዚህ ጥናት ተሳታፊ በመሆነዎ የሚደርስበዎት ምንም አይነት ችግር ወይም ጉዳት በፍጹም ሊኖር አይችልም፡፡ .

የተሳትፎ ክፍያን በተመለከተ

በዚህ ጥናት በመሳተፈዎ የሚያገኙት ምንም ክፍያ የለም፡፡

ያለ መሳተፍ ወይም ጀምሮ ማቋርጥ

በዚህ ጥናት ያለማሳተፍ ወይም ጀምረዉ የማቋረጥ መብተዎ የተጠበቀ ነዉ፤ ባለመሳተፈዎ ወይም በቋረጠዎ የሚደርስበዎት ምንም አይነት ተጽዕኖ አይኖርም፡፡

የሚያገኙት ሰዉ

ይህ የምርምር መጠይቅ በጎንደር ዩኒቨርሲቲ የምርምር ዕዉቅና ሰጭ ተቋማት ተፈትሾ አስፈላጊነቱ የተረጋገጠ ነዉ፡፡ ሆኖም ግን በጥናቱ ወቅትም ሆን በማንኛዉም ጊዜ ያልገባዎት ወይም ግልጽ ያልሆነለዎት መጠይቅ ካለ በሚከተለዉ አድራሻ መረጃ ያገኛሉ፡፡

1. ዋና ተመራማሪ፡- ሲሳይ ሰጠኝ አማረ
   ስልክ፡- 0913303280
2. አማካሪዎች፡- ወ/ሮ አዜብ አጥናፉ
   ስልክ፡- 0918774536
   አቶ ሙላት ገብረሂዎት
   ስልክ፡- 0910206667

11.6.2. Annex 2: የአማረኛ መጠይቅ

ጎንደር ዩኒቨርሲቲ ፣ በህክምናና ጤና ሳይንስ ኮሌጅ የህብረተሰብ ጤና አጠባበቅ ተቋም፤ በምዕራብ ባድዋች ወረዳ በ2006 ዓ.ም በማያጠቡ እና ባላረገዙ እድሜያቸዉ ከ 18 - 49 ዓመት በሆናቸዉ እናቶች ዙሪያ ክብደታቸዉ ከቁመታቸዉ ጋር ሲነጻጸር አነስተኛ የሆኑትን ለመለየት እና ተጓዳኝ ችግሮችን ለማወቅ የተዘጋጀ መጠይቅ፡፡

ሰላም እንደምን አሉ? ስሜ _____ ይባላል፡፡ እዚህ የመጣዉት ይኸነን ጥናት ለሚያካሂደዉ የጎንደር ዩኒርሲቲ የሁለተኛ ዓመት የኑትሪሽን (የስነ-ምግብ) ተማሪ የሆነዉ የአቶ ሲሳይ ሰጠኝ የጥናት ቡድን አባል ሆኜ ነዉ፡፡ ከዚህ በመቀጠል የእናቶችን የአመጋገብ ስርዓት ለማወቅ፤ በተለይም ክብደታቸዉ ከቁመታቸዉ ጋር ሲነጻፀር አነስተኛ የሆኑትን ያላረገዙ እና የማያጠቡ ዕድሚያቸዉ ከ18-49 ዓመት የሆናቸዉ እናቶች የተወሰኑ ጥያቄዎች ለመጠየቅ፤ እርሰዎን የዚህ ጥናት አካል አድርገን መርጠነዎታል፡፡ ስለሆነም ጥናቱ በእናቶች አመጋገብ ዙሪያ የሚታዩ ችግሮችን ከመቅረፍ አንጻር የሚኖረዉ ሚና የጎላ እንድሆን ለምንጠይቀዎት ጥያቄ የዕርሰዎ ትክክለኛ መልስ በጣም አስፈላጊ ነዉ ::

በጥያቄዎች ዙሪያ ጥርጣሬ ካደረብዎት ጠያቂውን እንደገና መጠየቅ ይችላሉ። ከእርስዎ የምናገኘውን ማንኛውንም መረጃ በሚስጥር እንጠብቃለን። ከዚህ ጥናት ጋር በተያያዘ በማንኛውም ቦታ እና ጊዜ ስምዎ እንደማይመዘገብና እንደማይጠቀስ ልንገልፅልዎ እንወዳለን። ለጥናቱ የምናሳትፍዎ የእርስዎን ሙሉ ፈቃደኝነት ስናገኝ ብቻ ነው፡፡ በመጠይቁ ያለመሳተፍ ወይም በመጠየቁ ሂደት ሊመልሱት የማይፈልጉትን ጥያቄ ያለመመለስ መብትዎ የተጠበቀ ነው፡፡ **መጠይቁ ከ 20 ደቂቃ በላይ አይፈጅም፡፡**

በመጠይቁ ለመሳተፍ ፈቃደኛ ነዎት?

1. አዎ ፈቃደኛ ነኝ ☐ መጠይቁ ይቀጥላል፡፡
2. የለም ፈቃደኛ አይደለሁም ☐ ወደ ሌላ ቤት መሸጋገር፡፡

የመረጃ ሰብሳቢዉ ስም _____ ፊርማ _____ቀን _____

የተቆጣጣሪዉ ስም፡- ---------- ፊርማ ---------- ቀን _____

የቀበሌዉ ስም ፡- ----------

ስለ ትብብረዎ በጣም እናመሰግናለን !!!

11.6.3. Annex 3: አማረኛ መጠይቅ

ሰንጠረዥ .3 ይህ መጠይቅ የተዘጋጀዉ በ 2014 ዓ.ም በምዕራብ ባድዋቾ ወረዳ ላሉ የማያጠቡ እና ነፍሰጡር ላልሆኑ እናቶች ክብደታቸዉ ከቁመታቸዉ ጋር ሲነጻጸር አነስተኛ የሆኑትን ብዛት እና ተጓዳኝ ችግሮችን ስለ መለየት፡፡

ተ.ቁ	መጠይቅ	ምላሽ	መግለጫ
1. ማህበራዊና ኢኮኖሚያዊ ሁኔታ መጠይቅ			
6.	ዕድሜ	---------- ዓመት	
7.	የጋብቻ ሁኔታ	1. ያገባች 2. የፈታች 3. ባል የሞተባት 4. ያላገባች 5. የተለያዩ	
8.	ሐይማኖት	1. ኦርቶዶክስ 2. እስልምና 3. ፕሮቴስታንት 4. ካቶሊክ 5. ሌላ ካለ, ይጠቀስ---------	
9.	ብሄር	1. ሀዲያ 2. ከምባታ 3. ወላይታ 4. አማራ 5. ሌላ ካለ, ይጠቀስ---------	
1.5.	የትምህርት ደረጃ	1. ማንበብ መጻፍ የማትችል 2. 1ኛ ደረጃ (1-8) 3. 2ኛ ደረጃ (9-12) 4. ሰርትፊኬት እና ከዚያበላይ	
1.6.	የስራ ሁኔታ?	1, የቤት እመቤት 2, ተማሪ 3, ገበሬ 4, ነጋደ 5, የቀን ሰራተኛ	

1.7.	የቤተሰብ ኃላፊ ማነዉ?	1. እናት 2. አባት	
1.8.	የቤት ኃላፊ የትምህርት ደረጃ?	1. ያልተማረ/ች/ 2. 1ኛ ደረጃ (1-8) 3. 2ኛ ደረጃ (9-12) 4. ሰረቲፊኬት እና ከዚያ በላይ	
2. የቤተሰብ የሀብት መጠን መለኪያ መጠይቆች			
4.16.	ቤት ዉስጥ ሬድዮ አለዎት?	1. አዎ , _____ (በቁጥር) 2. የለም	
4.17.	ቤት ዉስጥ ሞባይል አለዎት ?	1. አዎ , _____ (በቁጥር) 2. የለም	
4.18.	ቤት ዉስጥ ወንበር አለዎት? ‘	1. አዎ , _____ (በቁጥር) 2. የለም	
4.19.	ቤት ዉስጥ ቤተሰበዎ ፍራሽ ካናልጋዉ አላቸሁ?	1. አዎ , _____ (በቁጥር) 2. የለም	
4.20.	ጠረጴዛ አለዎ?	1. አዎ , _____ (በቁጥር) 2. የለም	
4.21.	ማታ ለመብራት የሚጠቀሙት ምንድን ነዉ?	ነ. ኩበት 2. እንጨት 3. ኩራዝ 4. ሌላ(ይገለጽ) _____	
4.22.	የቤት እንሰሳት እንደ ዶሮ፤ ከብት፤ንብ እና ሌሎችም ይኖራሉ?	1. አዎ 2. የለም, ከሌለ ወደ ጥያቄ **2.9**	
4.23.	ከሚከተሉት እንሰሳት መካከል ምንያህል ይኖረዎታል? (ከሌለ ዜሮ ይጻፍ) ሀ) ላም ፤ በሬ ፤ ጥጃ፤ ጊደር፤ ወይፈን ?	1. አዎ , _____ (በቁጥር) 2. የለም	
	ለ) ፍየል፤ በግ?	1. አዎ , _____ (በቁጥር) 2. የለም	

	ሐ) የንብ ቀፎ?	1. አዎ , _____ (በቁጥር) 2. የለም	
	መ) ዶሮ?	1. አዎ , _____ (በቁጥር) 2. የለም	
	ሠ) ፈረስ፤ አህያ፤ በቅሎ?	1. አዎ , _____ (በቁጥር) 2. የለም	
4.24.	የግል የለማ መሬት አለዎት?	_____ሄክታር.	
4.25.	ባመት ምን ያህል ሰብል ያመርታሉ? ሀ) ስንደ	1. አዎ , _____ (ኩንታል) 2. የለም	
	ለ) ገብስ	1. አዎ , _____ (ኩንታል) 2. የለም	
	ሐ) ጤፍ	1. አዎ , _____ (ኩንታል) 2. የለም	
	መ) በቆሎ	1. አዎ , _____ (ኩንታል) 2. የለም	
	ሠ) ማሽላ	1. አዎ , _____ (ኩንታል) 2. የለም	
	ረ) ሌላ ካለ _____	1. አዎ , _____ (ኩንታል) 2. የለም	

5. የጓሮ አትክልትን በተመለከተ

5.1.	በጓረዎ አትክልት እና ፍራፍሬ አለዎት?	1. አዎ 2. የለም , የለም ካሉ ወደ . **4.1** ይለፉ	
5.2.	ምንድን ነዉ ያለዎት?	1. አትክልት 2. ፍራፍሬ 3. ሁለቱንም 4. ሌላ ካለ _____	
5.3.	ለምንድን ነዉ አትክልቱን ወይም ፍራፍሬዉን የሚጠቀሙበት?	1. ለመሸጥ 2. ለቤት ዉጭ ሽፋን 3. ለሁሉም አላማ 4. ሌላ ካለ _____	

4.- የ24 ሰዓት ትዉስታን መሰረት በማድረግ የአመጋገብ ሁኔታን የምንለካበት ዘዴ

የምግብ ዓይነት ዝርዝሮችን በማንበብ የጥናቱ ተሳታፊ በ 24 ሰአት ዉስጥ በምግብ አይነቶች ስር ከተዘረዘሩት ምግቦች ቢያንስ አንዱን ከተመገበ በሳጥኑ ዉስጥ “1” ን ካልተመገበ ደግሞ “0” ን ያስቀምቱ፡፡

	የምግብ አይነት	በአካባቢው የሚገኙ የምግብ አይነቶች ዝርዝር	አዎ=1 የለም=0
a.	እህል እና የእህል ዉጤቶች	በቆሎ፤ዳቦ፤ፓስታ፡አንጀራ፡ሩዝ፤ቂንጬ፡የስንዴ ወይም የበቆሎ ንፍሮ ወዘተ…	
b.	በቫታሚን ኤ የበለጸጉ ምግቦች	ዱባ፣ ካሮት፣ ስኳር ድንች፣ ወዘተ.	
c.	ስራስር	ድንች,ቀይስር, ካሳቫ,ቆጮ (እንሰት) ወይም ሌላ ከስራስር የተሰራ ምግብ	
d.	አረንጓደ ቅጠላቅጠል	ያበሻ ጎመን፣ ጥቅል ጎመን፤ ሰላጣ፤ቆስጣ ወዘተ…	
e.	ሌሎች ቅጠላቅጠል	ለምሳሌ፡- ቲማቲም፣ ሽንኩርት	
f.	በቫታሚን ኤ የበለጸጉ ፍራፍሬዎች	የበሰለ ማንጎ እና የበሰለ ፓፓያ	
g.	በአይረን የበለጸጉ የንሰሳት ተዋፆዎች	ጉበት፣ ኩላሊት፣ ልብ፣ ወዘተ. የምግብ ዓይነቶች	
h.	ጥሬ ስጋ	የበሬ ወይም የላም፣ የጥጃ፣ የፍየል፣ የዶሮ፣ ወዘተ.	
i.	እንቁላል	ዶሮ፣እንቁላል	
j.	ጥራጥሬ	ባቄላ፣ አተር፣ ለዉዝ፣ ወዘተ.	
k.	ወተት እና የወተት ተዋፆዎች	ወተት፣ አይብ፣ እርጎ፣ እና ሌላም የወተት ተዋፆ	
l.	ዘይት እና ቅባት	ምግብ ላይ የሚጨመሩ እንደ ዘይት፣ ስብ፣ ቅቤ የመሳሰሉት	
m.	ጣፋጭ ነገር (ስኳር እና ማር)	ሻይ፣ ማር	
n.	ቅመማ ቅመምና የሚጠጡ ምግቦች	ሚጥምጣ፣ ጨዉ፣ ቡና፣ ሻይ፣ አልኮሆል፣ ጠላ ወይም ቦርደ	
o.	ባለፉት 24 ሰዓት ዉስጥ በቀን ስንት ጊዜ ተመገቡ ?	1. ከሶስት ጊዜ ያነሰ 2. 3 ምግብ 3. 4 ምግብ 4. ከ 4 ምግብ በላይ	

5. የንጹህ ዉኃ አቅርቦትን በተመለከተ

5.1	የመጠጥ ዉኃ ከየት ነዉ የሚያገኙት?	1. ከህዝብ ቧንቧ 2. ከምንጭ 3. ከወንዝ 4. ሌላ ካለ ይጠቀስ _____	
5.2	የሚጠጡትን ዉኃ ያጣራሉ?	1. አዎ 2. አይደለም ካሉ ወደ ቁጥር **5.4**	

5.3	እንደት ነዉ የሚያከሙት/ የሚያጣሩት/?	1. በማፍላት 2. በንጹህ ጨርቅ 3. ሌላ ካለ ይጠቀስ _____	
5.4	ዉኃ ቀድቶ ለመመልስ ባማካይ ምን ያክል ጊዜ ይፈጅበሻል?	_____ ደቂቃ	
5.5	ዉኃ ለመቅዳት ስንት ጊዜ ትመላለሻለሽ?	1. በቀን አንድ ጊዜ 2. በቀን ሁለት ጊዜ 3. ሶስት እና ከዚያን በላይ	
6. ሽንት ቤትን በተመለከተ			
6.1	ሽንት ቤት አላችሁ?	1. አዎ 2. የለም፣ ከሌለ ወደ ጥያቄ. 6.3 ይለፉ	
6.2	ከሽንት ቤት መልስ እጅ ትታጠባለችሁ?	1. አዎ 2. የለም	
6.3	ሽንት ቤት ከሌለ የት ነዉ የምትጠቀሙት?	1. የህዝብ መጸዳጃ 2. ሜዳ ላይ 3. ሌላ፣ ካለ _____	
7. የእናት የጤና ሁኔታ			
7.1.	ስንት ጊዜ አርግዘዋል?	_____	
7.2.	ስንት ልጆች ወለዱ?	_____	
7.3.	የመጨረሻ ልጅዎ ዕድሜ?	_____ ወር.	
7.4.	በአንዲላይ የሚኖሩ የቤተሰብ ቁጥር?	ወንድ____ ሴት____ ድምር.____	
8. ጤናን በተመለከተ			
8.1.	ባለፈዉ አንድ ወር ዉስጥ የወር አበባ አይተዋል?	1. አዎ 2. አይደለም	
8.2.	ባለፉት አንድ ወራት ዉስጥ የህመም ነበረበዎት?	1. አዎ 2. አይደለም , ወደ ጥያቄ. **9.1** ይለፉ	
8.3.	አዎ ካሉ፤ የበሽታዉ ዓይነት ምን ነበር?	_____	
8.4.	ለምን ያህል ጊዜ ነዉ በሽታዉ የቆየበዎት?	1. ከሳምነት ባነሰ ጊዜ	

		2. 1-2 ሳምንት 3. 3-4 ሳምንት 4. ሌላ _____ ሳምንት	
8.5.	መቸ ነዉ ከህመምሽ ያገገምሽዉ / የተሻለሽ/ ?	1. በዚህ ሳምንት 2. ከሁለት ሳምንት በፊት 3. ከሶስት ሳምንት በፊት 4. ሌላ ካለ _____	
9. የሰዉነት ልኬት			
9.1.	ክብደት በኪ.ግ (ወደ ዐ.ነ ኪ.ግ ይቀራረብ)	_____ ኪ.ግ.	
9.2.	ቁመት በሴ.ሜ (ወደ ዐ.ነ ሴ.ሜ ይቀራረብ)	_____ ሴ.ሜ.	

11.7. Annex 7: - Principal Component Analysis for household wealth index.

Total Variance Explained

Component	Initial Eigen values			Extraction Sums of Squared Loadings			Rotation Sums of Squared Loadings		
	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %	Total	% of Variance	Cumulative %
1	36.769	69.412	69.412	36.769	69.412	69.412	5.676	10.714	10.714
2	5.772	10.896	80.308	5.772	10.896	80.308	34.707	65.519	76.234
3	4.255	8.032	88.341	4.255	8.032	88.341	6.413	12.107	88.341
4	2.413	4.555	92.896						
5	.851	1.606	94.501						
6	.726	1.371	95.873						
7	.509	.960	96.833						
8	.358	.676	97.509						
9	.214	.404	97.913						
10	.205	.387	98.300						
11	.196	.369	98.669						
12	.164	.309	98.978						
13	.156	.295	99.273						
14	.146	.276	99.549						
15	.122	.231	99.780						
16	.088	.166	99.946						
17	.026	.049	99.995						
18	.003	.005	100.000						

Extraction Method: Principal Component Analysis

11.8. Annex 8: - Declaration

I the undersigned, senior Applied human nutrition student declare that this thesis is my orgional work in partial fulfilment of the requirment for the degree of master of science in Applied human nutrition.

Name of the student: Date signature

Sisay Setegn Amare _____ _____

Places of summition : Institute of public health, collage of medicine and health sciences, university of Gondar.

Date of submission: _____

This thesis work has been submitted for examination with my/our approval as university advisor(s).

Adivisor name:- : Date signature

1. _____ _____ _____
2. _____ _____ _____